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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/596,653

06/20/2006

Takeo Okabe

OGOSH56USA

8832

270 7590 11/12/2009
HOWSON & HOWSON LLP
501 OFFICE CENTER DRIVE
SUITE 210
FORT WASHINGTON, PA 19034

EXAMINER

BAND, MICHAEL A

ART UNIT

PAPER NUMBER

1795

NOTIFICATION DATE

DELIVERY MODE

11/12/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@howsonandhowson.com

Office Action Summary	Application No. 10/596,653	Applicant(s) OKABE ET AL.	
	Examiner MICHAEL BAND	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 7-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 7-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2 and 7-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al (US Patent No. 6,619,537) in view of Fukuda (JP No. 03079734) and Bolcavage et al (US Patent No. 6,579,431).

With respect to claims 1-2, Zhang et al discloses a sputter target assembly including a high purity copper sputter target diffusion bonded to a backing plate of a copper alloy and an interlayer composed of Ni-Cr and Ni-Si (abstract). The interlayer is included as the backing plate since said interlayer is interdiffused to the backing plate (col. 4, lines 54-58). However Zhang et al is limited in that specific weight percentages Si are not suggested.

Fukada teaches a copper alloy for a backing plate, where the copper alloy comprises 0.05 to 0.8% Cr and 0.01 to 0.3% Si (abstract). Fukada cites the advantages of the specified weight percentages as reducing deformation due to thermal strains, permit repeated use, and improving the heat conductivity (abstract).

It would have been obvious to one of ordinary skill in the art to use the specified copper alloy weight percentages taught by Fukada for the copper alloy backing plate of

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Zhang et al to gain the advantages of reducing deformation due to thermal strains, permit repeated use, and improving the heat conductivity.

However Zhang et al is further limited in that a specific weight percentage of Ni is not suggested.

Bolcavage et al teaches diffusion bonding of high purity metals and metal alloys of copper targets and copper backing plates using nickel or nickel alloy interlayers (abstract; col. 3, lines 18-36), where said Ni alloy is Ni 1% with Cr (col. 7, lines 44-56). It has been held that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. See MPEP 2144.05, Section I. Bolcavage et al cites the advantage of this Ni percentage as providing a copper target/backing plate assembly that can withstand prolonged high power sputter usage periods without significant target/backing plate debonding (col. 3, lines 18-23).

It would have been obvious to one of ordinary skill in the art to use approximately 1% Ni for the backing plate material as taught by Bolcavage et al for the Ni alloy of Zhang et al to gain the advantage providing a copper target/backing plate assembly that can withstand prolonged high power sputter usage periods without significant target/backing plate debonding.

With respect to claims 7 and 10, modified Zhang et al further discloses a copper alloy having similar weight percentages of Cr, Ni, and Si as discussed above. Therefore it is expected that the copper alloy backing plate possesses the properties of an electrical conductivity of 35 to 60% and 0.2% proof stress of 400 to 850 MPa.

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With respect to claims 8-9 and 11-14, modified Zhang et al further discloses using a hot isostatic pressing (HIPing) method to use diffusion bonding of the target and backing plate (col. 5, lines 4-9), where the diffusion bonding is at a temperature of about 350°C (col. 5, lines 51-59).

3. Claims 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al (US Patent No. 6,619,537) in view of Morita et al (JP No. 07268617).

With respect to claim 17, Zhang et al discloses a sputter target assembly including a high purity copper sputter target diffusion bonded to a backing plate of a copper alloy and an interlayer composed of Ni-Cr and Ni-Si (abstract). The interlayer is included as the backing plate since said interlayer is interdiffused to the backing plate (col. 4, lines 54-58). However Zhang et al is limited in that specific weight percentages of Ni and Si are not suggested.

Morita et al teaches forming a sputtering target and a backing plate from an Al-M alloy, where M is one or more of Mg, Cr, Ni, and Cu (abstract; para 0013). Morita et al also teaches having M controlled to 1-40 wt%, with Si between 0.02-1.0% and Ni between 2-40% (abstract).

It would have been obvious to one of ordinary skill in the art to use the percentages of Si and Ni in the sputtering target and backing plate taught by Morita et al for the Ni and Si present in the backing plate of Zhang et al since Zhang et al fails to specify particular percentages and one of ordinary skill would have a reasonable expectation for success in making the modification since Morita et al has shown success in forming backing plate comprising Cu, Ni, and Si.

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With respect to claim 20, modified Zhang et al further discloses a copper alloy backing plate having the claimed weight percentages of Ni and Si as discussed above. Therefore it is expected that the copper alloy backing plate possesses the properties of an electrical conductivity of 35 to 60% and 0.2% proof stress of 400 to 850 MPa. If not, it must be due to limitations not currently present.

4. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al (US Patent No. 6,619,537) in view of Ishikura (JP No. 01180975).

With respect to claim 15, Zhang et al discloses a sputter target assembly including a high purity copper sputter target diffusion bonded to a backing plate of a copper alloy and an interlayer composed of Ni-Cr and Ni-Si (abstract). The interlayer is included as the backing plate since said interlayer is interdiffused to the backing plate (col. 4, lines 54-58). However Zhang et al is limited in that including Be into the copper alloy is not suggested.

Ishikura teaches a backing plate for sputtering, where the backing plate is copper having a purity of at least 99.7% with Be added from 100~3000 wt. ppm (abstract). Ishikura cites the advantage of adding the Be to the backing plate as producing a significant cooling effect from satisfactory heat conductivity and the diffusion of Cu being inhibited (abstract).

It would have been obvious to one of ordinary skill in the art to incorporate adding Be to the copper backing plate taught by Ishikura for the copper alloy backing plate of Zhang et al to gain the advantage of producing a significant cooling effect from satisfactory heat conductivity and the diffusion of Cu being inhibited.

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5. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al (US Patent No. 6,619,537) and Morita et al (JP No. 07268617) as applied to claim 17 above, and further in view of Fukada (JP No. 03079734).

With respect to claims 18-19, the references are cited as discussed for claim 17. However modified Zhang et al is limited in that specific percentages of Cr and Mg present in the backing plate are not suggested.

Fukada teaches a copper alloy for a backing plate, where the copper alloy comprises 0.05 to 0.8% Cr, 0.001 to 0.5% Mg, and 0.01 to 0.3% Si (abstract). Fukada cites the advantages of the specified weight percentages as reducing deformation due to thermal strains, permit repeated use, and improving the heat conductivity (abstract).

It would have been obvious to one of ordinary skill in the art to use the specified copper alloy weight percentages taught by Fukada for the copper alloy backing plate of modified Zhang et al to gain the advantages of reducing deformation due to thermal strains, permit repeated use, and improving the heat conductivity.

Response to Arguments

103 Rejections

6. Applicant's arguments filed 7/9/2009 have been fully considered but they are not persuasive.

7. On p. 5-14, the Applicant argues that Zhang et al does not teach directly diffusion bonding the backing plate to the sputter target since an interlayer is sandwiched between said sputter target and said backing plate.

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The Examiner respectfully disagrees. The claims do not require the sputter target to be directly bonded to the backing plate, only that the sputter target and backing plate are diffusion bonded. In addition, the interlayer is interpreted to be part of the backing plate since said interlayer is interdiffused to the backing plate (col. 4, lines 54-58), thus said interlayer is a part of said backing layer.

8. On p. 6-8, the Applicant argues that Bolcavage et al does not disclose Cu backing plates, only Al or Al alloy backing plates. The Applicant also argues that the nickel percentage has been misinterpreted, and should actually read as Al or Cr being 1% with nickel being the balance.

The Examiner respectfully disagrees. Bolcavage et al teaches Al alloy backing plates for sputter targets (abstract; col. 3, lines 25-32), with Bolcavage et al also teaching that a need exists for a lightweight copper target/backing plate assembly capable of withstand prolonged high power sputter usage periods without significant target/backing plate debonding (col. 3, lines 19-23), thus one of ordinary skill would conclude from the teachings of Bolcavage et al that copper would be included in the sputter target in addition to the Al alloy backing plate in order to satisfy the need for the lightweight assembly. Regarding the misinterpretation, Bolcavage et al does not specify what is primarily used for the entire intermediate layer, only that a nickel alloy is used. Since a nickel alloy can be interpreted as being an alloy with nickel as 1% and the balance being either Al or Cr, Bolcavage et al teaches the intermediate layer having a nickel percentage of 1%.

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9. On p. 8-9, the Applicant argues that that the backing plates of Zhang et al and Bolcavage et al are not made of Cu-Ni-Si alloys since an alloy is a uniform mixture of metals, thus the separate Ni-alloy interlayer of Zhang et al and Bolcavage et al is bonded to a surface of the backing plate does not make the backing plates an alloy including Ni.

The Examiner respectfully disagrees. Zhang et al teaches the Cu backing plate having a Ni-Si interlayer which is interdiffused to the backing plate (col. 4, lines 54-58), thus the Ni-Si interlayer is intermixed into the Cu backing plate through interdiffusion. Regarding an alloy defined as a uniform mixture, *Merriam-Webster Online Dictionary* defines as a substance composed of two or metals united usually by being fused together. Therefore the Ni-Si layer interdifused with the copper backing plate forms a Cu-Ni-Si alloy backing layer.

10. On p. 9, the Applicant argues that Zhang et al teaches away from directly bonding a target to a backing plate.

The Examiner respectfully disagrees. As stated above, the claims do not require the sputter target to be directly bonded to the backing plate, only that the sputter target and backing plate are diffusion bonded. Furthermore the interlayer is interpreted to be part of the backing plate since said interlayer is interdiffused to the backing plate (col. 4, lines 54-58), thus said interlayer is a part of said backing layer.

11. On p. 10-11, the Applicant argues that the combination of Zhang et al, Bolcavage et al, and JP '734 are mere conclusory statements and contain no rational underpinning to support the legal conclusion of obviousness.

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The Examiner respectfully disagrees. Proper legal conclusions for the combination of the three references have been given in the motivational statements above for why one of ordinary skill would be motivated to combine the references Bolcavage et al and JP '734 with the primary reference Zhang et al.

12. On p. 11-12, the Applicant argues that the combination of references would not expectedly yield the claimed properties.

The Examiner respectfully disagrees. The combination of references reads on the claimed limitations, where said limitations yield the claimed properties. Therefore since the combination of references teaches the claimed limitations which yield the claimed properties, it is expected that the combination of references also inherently teach the claimed properties. If not, it must be due to limitations not currently present.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 9am-5pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

15. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1795

/Jennifer K. Michener/

Supervisory Patent Examiner, Art Unit 1795